in contact with dilute mineral acids caused notable decomposition of the hydrazoic acid. A large number of metallic salts were prepared and analysed, and in every case the salts were found to be anhydrous. The metallic derivatives differ considerably in their explosive properties. Thus, of the derivatives containing the metals of the alkalis and alkaline earths (with thallium), lithium nitride is the only one exploding violently on heating, and thallium nitride the only one detonating when struck on an anvil. The action of heat upon the nitrides of these two groups is very remarkable, as when small quantities of the nitride are heated carefully in thin glass tubes, decomposition takes place quietly, nitrogen being evolved, and the pure metal left behind; this being, as the authors point out, much the easiest method of preparing small quantities of barium, strontium, and calcium.

THE additions to the Zoological Society's Gardens during the past week include an Egyptian Jerboa (*Dipus aegyptius*) from North Africa, presented by Miss Da Costa; an African Buzzard (*Buteo desertorum*), an Iceland Falcon (*Hierofalco islandus*), captured in the Red Sea, presented by Captain E. W. Burnett; a Peregrine Falcon (*Falco peregrinus*), captured in the Red Sea, presented by Captain Bear; a Rough-keeled Snake (*Dasypeltis scabra*) from South Africa, presented by Mr. H. Oakley; two Scops Owls (*Scops giu*), South European, deposited; a Brazilian Tapir (*Tapirus americanus*, ♀) from the Upper Amazons, two Common Rattlesnakes (*Crotalus durissus*) from North America, purchased; an Axis Deer (*Cervus axis*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

THE GEMINIDS.—For the greater part of the evenings of the 10th, 11th and 12th of this month, clouds prevented observations of the Geminids in London. Late on the night of the 12th, however, when the sky became to some extent clear, a brief watch of an hour, from 11h. 30m. p.m. to 12h. 30m. a.m. G.M.T., disclosed the fact that these meteors were very much *en evidence*. Between 11h. 30m. and 12h. 5m. no less than twenty-four Geminids were observed, four of which were of great brilliancy and brighter than a first magnitude star. The direction of observation was necessarily restricted towards the north-west. Curiously enough, a further watch from that time until 12h. 30m. was only rewarded by the observation of one meteor, and that not a Geminid, which gave one the impression that the shower had terminated. Clouds prevented further observation. Whether the shower was more brilliant earlier in the evening cannot, so far as this place of observation is concerned, be stated. Another observer, Mr. W. E. Rolston, of the Royal College of Science, South Kensington, was also surprised at what appeared to be quite a shower of meteors on the same evening. He recorded the appearance of several meteors during the interval 11h. 15m. p.m. to 12h. 20m. a.m. G.M.T., one of which, as he describes, "an exceptionally long and bright one, leaving a long trail of reddish sparks, which lasted for about two seconds." The same observer also mapped nine true Geminids on the night of the 9th.

COMET CHASE.—Using the same elements as those we published in our last number, the following is the ephemeris for the current week.

Ephemeris for Berlin Mean Midnight.

1898.		R.A. (app.) h. m. s.		Decl (app.) ° ′		Br.
Dec. 14	...	10 47 51	...	+25 49·3	...	1·39
,, 16	...	49 51	...	26 6·0		
,, 18	...	51 44	...	26 23·4		
,, 20	...	53 31	...	26 41·3		
,, 22	...	10 55 11	...	+26 59·8	...	1·39

The comet is thus still in the constellation of Leo, and is situated approximately between 54 and 57 Leonis. It is now brighter than it was at the time of its discovery. Prof. E. Weiss thinks that it may be identical with 1867 I.

It is interesting to remark that the comet was discovered photographically near the radiant point of the Leonid meteor swarm. Four other photographs taken—two at the Yale, and two at the Harvard observatories—have corroborated its presence.

THE TOTAL SOLAR ECLIPSE OF JANUARY 22, 1898.—We have received from the Survey of India Department the report on the observations made at Dumraon, Pulgaon, and Sahdol during the recent solar eclipse. The report is divided into three sections, each section giving an account of the arrangements and observations made at the three different stations. The first, somewhat necessarily brief, is written by Mr. T. A. Pope, Assistant Surveyor-General, who had charge of a three-inch photographic doublet. With this instrument an excellent series of plates of the corona was obtained, one of which is reproduced as frontispiece to the present volume. The Pulgaon report, by Captain G. P. Lenox Conyngham, R.E., contains an interesting and well illustrated description of the camp, and the programme which the party had before them. Mr. Newall and Captain Hills, it will be remembered, occupied this station, and received valuable assistance from the officers and others present. The report on the observations at Sahdol, by Major S. G. Burrard, R.E., is somewhat more voluminous than the two preceding. In addition to a general account of the arrangements as regards the camp distribution and the preparatory work of the observers, such results as could be immediately deduced are given. Thus, for instance, we have a comparison between the temperature curves obtained on the actual and following day of the eclipse, showing clearly the drop from the time of first contact to about half an hour after totality, and the subsequent rapid rise. The large assembly at Sahdol made it possible to organise a party to make sketches of the corona. This was done, with the result that we have here thirty-one facsimiles of the hand-drawings made. After an examination of these sketches, we can truthfully remark, with Major Burrard, that "the accordance between these drawings is more remarkable than their discrepancies." The remaining portion of the report is devoted to a brief summary of the Hindu method of eclipse prediction, a chapter on future total solar eclipses in India, with twelve charts of tracts of past and future solar eclipses, and lastly to the answers to a series of questions concerning the corona and the attendant phenomena.

The volume, which is published under the direction of Major-General C. Strahan, R.E., the Surveyor-General of India, is very well illustrated, and should serve as a useful guide and source of valuable information for future eclipse expeditions.

NOVEMBER METEORS. — The *Harvard College Circular* (No. 35), which has just come to hand, describes in a brief manner an account of the preparations for observing the Leonid shower in America, and the preliminary results obtained. It will be remembered that last year Prof. E. C. Pickering organised a large staff of observers not only to make visual observations, but to record, if possible, their trails and spectra photographically. This year the organisation was even more complete, and stations were selected all round the earth in order that the number of visible meteors might be counted during the entire period that the earth passed through the swarm. The present *Circular* deals with the observations made at Cambridge (U.S.A.) and Providence, the reports from other stations not having yet arrived.

At the former town the night of the 13th was cloudy, but the 14th was clear. Thirty persons at the observatory recorded 800 meteors, not including duplicates, the maximum number having occurred at 3 o'clock in the morning, when 61 meteors east of the meridian were counted in thirty minutes. No less than 227 trails of eighty different meteors within 30° of the radiant were charted. At Providence the vicinity of the radiant point was continuously watched by at least ten observers, and 400 meteors were seen. Prof. Pickering chose this station (which is forty miles south of Cambridge) for visual determinations of parallax.

As regards the success of photography for this work, the results obtained seem very promising. Ninety-six photographs were taken at Cambridge with the Draper telescopes, and eleven with smaller instruments. Not only were photographic doublets employed, but prisms were utilised; but these, unfortunately, failed to give any record. By means of the doublets thirty-one trails of eight different meteors were photographed, three of which appeared on one plate. Four meteors were photographed at both stations, so that the parallax can be obtained photographically. A preliminary determination of the radiant point

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gives the position for 1900 as R.A. 10h. 6·8m., Dec. +20° 16m., which is 9m. following, and 38′ south of that given by Denning. Some peculiarities of the photographed trails were that they attained a maximum and then diminished as rapidly as they increased, sudden changes due to explosion were well shown, the trail was sometimes surrounded by a sheath of light, and lastly, in one case the trail remaining after the meteor had passed was recorded.

ASTRONOMICAL CONGRESS AT BUDAPEST

AS was announced in NATURE of August 25, the International Astronomical Association (*Astronomische Gesellschaft*) held its seventeenth Congress at Budapest at the end of September.

The meeting was an unusually large one, and the reception by the Hungarian colleagues and the scientific and political authorities was exceedingly cordial. There were present, amongst others, the directors of the Observatories of O'Gyalla (von Konkolv), Hérény (von Gothard), Kalocsa (Father Fenyi, S.J.), Vienna (Weiss), Munich (Seeliger), Karlsruhe (Valentiner), Heidelberg (Wolf), Göttingen (Schur), Jena (Knopf), Berlin (Foerster), Breslau (Franz), Bamberg (Hartwig), Turin (Porro), Upsala (Dunèr). Besides these, many well-known astronomers attended, such as Müller, of Potsdam; Nyren, of Pulkova; Pechüle, of Copenhagen; Schröther, of Christiania; Kreutz, director of the International Bureau at Kiel, and of the *Astronomische Nachrichten;* Bauschinger, director of the Institute of astronomical calculations of Berlin, and many others. The absence of English and French astronomers, many of whom form part of the Society, was much regretted, and perhaps it is due to this fact that the Congress, out of natural reserve, abstained from raising the question of the fundamental stars and constants, resolved, perhaps too hastily, by the Conference at Paris in 1896.

The first meeting was opened by President Seeliger on September 23, in the large hall of the Academy of Science, where all the subsequent meetings were also held. Von Wlassics, the Minister of Education, who afterwards offered lunch to the members of the Congress, the burgomasters of Budapest, and Baron Eötvös, President of the Academy, well known for his experiments on gravitation, attended.

In the meetings of September 25, 26 and 27, besides other affairs of the ordinary business of the Society and the confirmation of the members of the Presidency, retiring by seniority, many scientific subjects, briefly referred to here, were discussed. Prof. Schür described the new reductions of the observations of planets and comets, made at Bremen by Olbers. Such reductions are made after the original notes of Olbers, placed at the disposal of the Göttingen Observatory. Dr. A. Stichtenoth, together with Prof. Schür, takes part therein. In the first place are discussed the determinations of time made by Olbers through observations of the setting of the principal stars behind the vertical side of the tower of the observatory, then the measures of the radius of the circular micrometer adopted, by the medium of the observations of couples of stars applied to the comparison with one particular comet; and lastly, these same planetary and cometary observations. In the published papers the times of the observations and the distances along the circle of declination of the comet and the comparison stars from the centre of the ring will be given. It is hoped that it will be possible to place these important materials at the disposal of astronomers during next year.

Dr. Bidschof, of the Imperial Observatory of Vienna, gave an account of some catalogues completed by him. These contain a list of the nebulae that were determined micrometrically at the observatory of Vienna up to the end of 1897, besides a stellar catalogue, containing the results of the new observations of the southern stars of Santini, executed at the Viennese observatory.

Dr. Brendel, of Göttingen Observatory, referred to the publication of Gauss's works. Soon after the death of Gauss the editing of his works was confided to Prof. Schering, of the Royal Academy of Göttingen. Schering published six large volumes, but did not succeed in completing the publication, so that, besides the great part of astronomical subjects published in the sixth volume, and the "Theoria Motus," printed in the seventh, the numerical discussion of the perturbations of the motion of Pallas, which will occupy the remainder of the seventh volume, remained unedited. Concerning this, it is necessary to note that, Gauss having left an enormous quantity of material (above half a million of figures) on this subject, without sufficient explanation, the reconstruction of the mode of these calculations becomes very difficult, though not impossible. The so-called libration, connected with the curious phenomenon, by which seven evolutions of Jupiter correspond exactly to eighteen of Pallas, presents special interest. The eighth volume will contain additions to all the materials of mathematics and physics dealt with in the fifth. Finally, the ninth volume will be concerned with biographical matters.

Prof. Franz demonstrated that the lunar globe previous to its solidification must have been elongated in the direction of the earth by the tides produced by our planet. Whilst the theory of tides and the physical libration assigns to such elongation the small amount of 0·0001 of the radius, Gussen, from the measure of two lunar photographs in different librations, obtained the considerable elongation of 0·0500. To eliminate such contradictions between the theory and the observation, Prof. Franz has measured five lunar photographs from the Lick Observatory in various combinations, and found an elongation of the lunar globe of 0·0027. Thus a nearer approach to the theory is reached, which, however, cannot result in complete accord, through the want of homogeneity in the lunar mass. Hansen put forward the hypothesis that the opposite part of the moon was deeper, so that it had gathered on itself water and air, thus rendering animal and vegetable life possible. On this hypothesis a lively and interesting discussion ensued between Profs. Foerster and Franz.

Dr. Witt, of the Urania Observatory of Berlin, observed that a simple glance at the stereoscopic views of the moon shows a considerable elongation.

Dr. Marcuse, formerly delegate of the Geodetic Office of Potsdam, in the Sandwich Islands, for the study of the variation of latitudes, called attention to the necessity of generally extending the methods of photographic registration of the observations of latitudes, applying them in quite a general manner to the geographical determinations obtained in travelling. He considers, having had occasion from 1893 to superintend the construction of a photographic zenithal telescope, and afterwards to use it, that the photographic registration of the measures of altitudes and transits can be easily obtained by means of a convenient universal instrument, adapted to visual as well as photographic measuring; and that with it, surety and precision are gained. An instrument for that purpose is being constructed.

Dr. Max Wolf, of Heidelberg, so well known for his photographic discoveries of small planets, spoke on the researches made by him on an objective worked by Dr. Pauly in Jena, with the aperture of 21·2 cm., and the focal distance of 445 cm. It is formed of the new glass of Jena, and must possess better chromatic corrections than the old systems. In fact, the investigation with the spectroscope has shown that the colours are exactly comprised from the extreme red to the blue; only towards the G line the colours begin to deviate. A comparison of the curve that represents the position of the focal points corresponding to the various colours, with analogous curves given by objectives of Fraunhofer, Grubb and Clark, shows the superiority of the objective of Pauly to the best anterior ones. While the deviation of the focus in the middle of the blue scarcely reaches to 0·00003 of the focal distance, that of 0·00065, determined by Clark, is far the least considerable of those remaining. The correction of sphericity is also small. Many delicate couples of stars are separated; *e.g.* η Coronae (distance 0·″4), μ_2 Bootis (0·″9), 1 Coronae (0.″4), λ Cassiopeiae (0·″6), μ Cygni (2·″9), ξ Hercules (0·″5), $o\Sigma$ 338 (0·″7), Σ 2695 (0·″9), Arcturus in the angle of position 120° appears lengthened; ζ Bootis and 52 Arietis could not be resolved. The size of the stellar discs amounts to 0″24 for the sixth magnitude, to 0·″15 for the eighth. Dr. Pauly added some explanations on the manufacture of the new objective. The first attempts to eliminate the secondary spectrum go back to the year 1886; but then the glass used was not suitable. Only for two years has it become possible to obtain a new glass perfectly well adapted, the dispersive properties of which insure absolute elimination of the secondary spectrum. The pictures of the sun and moon are surprising, especially of the moon.

Prof. Porro presented a paper by the new member of the Association, Prof. Vito Votterra, of the Turin University, on the mechanical theory of the motions of the terrestrial pole. In this paper are recapitulated the results of a more extended work, which will be published in *Acta Mathematica.*

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